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PREPARATIONS FOR THE UNITED NATIONS CONFERENCE
ON ENVIRONMENT AND DEVELOPMENT ON THE BASIS OF
GENERAL ASSEMBLY RESOLUTION 44/228 AND TAKING
INTO ACCOUNT OTHER RELEVANT GENERAL ASSEMBLY
RESOLUTIONS:

MANAGING FRAGILE ECOSYSTEMS: SUSTAINABLE MOUNTAIN DEVELOPMENT
(Section II, Chapter 5 of Agenda 21)

Report of the Secretary-General of the Conference

INTRODUCTION

1. Mountains are an important source of water, energy and biological diversity. Furthermore they are a source of key resources such as water, minerals, forest products, agricultural products and recreation. As a major ecosystem representing the complex and interrelated ecology of our planet, mountain environments are essential to the survival of the global ecosystem. Mountain ecosystems are however, rapidly changing. They are susceptible to accelerated soil erosion, landslides and rapid loss of habitat and genetic diversity. On the human side, there is widespread poverty among mountain

inhabitants and loss of indigenous knowledge. As a result, most global mountain areas are experiencing environmental degradation. Hence, the proper management of mountain resources and socio-economic development of the people deserves immediate action.

2. About 10 per cent of the world's population depends on mountain resources. A much larger percentage draws on other mountain resources, including especially water.

3. Recognizing the interplay of ecological and developmental factors, the Preparatory Committee in its third session requested the Secretary-General of UNCED to further elaborate the problem of fragile ecosystems and develop separate programs with regard to all the mountains of the world (A/CONF.151/PC/WG.I/L.34/Rev.1). In view of this decision two programme areas are proposed as follows:

- A. Generating and Strengthening Knowledge about Mountain Ecosystems
- B. Promoting Integrated Watershed Development and Alternative Livelihood Opportunities

PROGRAMME AREAS

A. GENERATING AND STRENGTHENING KNOWLEDGE ABOUT MOUNTAIN ECOSYSTEMS

Basis for action

4. Mountains are highly vulnerable to human and natural ecological imbalance. Specific information on the ecology, natural resource potential and socio-economic activities is essential. Mountain and hillside areas hold a rich variety of ecological systems. Because of the vertical dimensions, mountains create gradients of temperature, precipitation and insolation. A given mountain slope may include several climatic regimes such as tropics, subtropics, temperate, and alpine each of which represent microcosms of larger habitat diversity. There is, however, a lack of knowledge of mountain ecosystems. The creation, therefore, of a global mountain database is vital for launching programs that would contribute to sustainable development of mountain ecosystems.

Objectives

- 5. By 2000, undertake a global survey of crop, plant and animal genetic resources of mountain ecosystems.
- 6. Generate global and area-specific database and information systems to facilitate the environmental assessment of mountain ecosystems.
- 7. Improve and build the existing ecological knowledge base regarding technologies and agricultural and conservation practices in the mountain regions of the world.

8. Create and strengthen an effective communications network and information clearing house for existing organizations concerned with mountains issues.

Activities

Management related:

9. National governments should:

- a. Strengthen existing institutions at national and regional levels to generate a multidisciplinary ecological knowledge base on mountain ecosystems.
- b. Promote national policies that would provide incentives for the use and transfer of environmentally friendly technologies as well as farming and conservation practices.
- c. ** (A/CONF.151/PC/WG.I/CRP.12/Rev.1, para. 14a) < Build up the knowledge base by creating mechanisms for cooperation and information exchange among national and regional institutions working on fragile ecosystems. > **
- d. Encourage policies that would provide incentives to farmers and local people to undertake conservation measures.

Data and Information:

10. National governments should:

- a. Establish meteorological and hydrological monitoring stations that would encompass the climatic diversity of various mountain regions of the world.
- b. Build an inventory of crop, plant and animal genetic resources, giving priority to those under threat of extinction. Genetic resources should be protected in situ by establishing protected areas and improving traditional farming and animal husbandry activities.
- c. Identify hazardous areas that are most vulnerable to erosion, floods and land slides as well as those with little potential for agricultural development.
- d. Develop databases on the land cover characteristics, particularly forest cover, and on the use of local forest products in mountain ecosystems.

International and Regional Cooperation:

11. National governments and intergovernmental organizations should:

- a. Coordinate international cooperation and facilitate an exchange of information and experience among United Nations agencies, the World Bank, the International Fund for Agricultural Development (IFAD), and regional organizations, national governments, research institutions and NGOs working on mountain development.
- b. Encourage international networking of people's initiatives and the activities of international and local NGOs working on mountain development such as the International Mountain Society (IMS), Woodland Mountain Institutes (WMI) and the International Center for Integrated Mountain Development (ICIMOD) as well as support them in exchange of information and experience.

Means of Implementation

Financing and Cost Evaluation:

12. The total cost required to implement this programme area is about US\$ 330 million a year, while the average annual financing required from international sources is about US\$ 50 million. This includes US\$ 40 million for technical cooperation and US\$ 10 million for strengthening of international institutions, particularly that of UNESCO, World Conservation Union (IUCN), International Mountain Society (IMS), Woodland Mountain Institutes (WMI) and the International Center for Integrated Mountain Development (ICIMOD) ICIMOD.

Scientific and Technological Means:

13. National governments with the appropriate international and regional agencies should ***(A/CONF.151/PC/WG.I/CRP.12/Rev.1, para. 14j)< Strengthen of scientific research and technological development programs including diffusion through national and regional institutions in this field>**** (particularly in meteorology, hydrology, forestry, soil sciences and plant sciences).

Human Resource Development:

14. National governments should:

- a. Launch training and extension programs in environmentally appropriate technologies and practices that would be suitable to mountain ecosystems.
- b. Support higher education through fellowships and research grants for environmental studies in mountains and hill areas, particularly for candidates from indigenous mountain populations.

Capacity Building:

15. National governments should ****(A/CONF.151/PC/WG.I/CRP.12/Rev.1, para. 14e) < Build up national and regional institutional bases that could carry research, training and dissemination of information on the sustainable development of the economies of fragile ecosystems.>****

B. PROMOTING INTEGRATED WATERSHED DEVELOPMENT AND ALTERNATIVE LIVELIHOOD OPPORTUNITIES

Basis for action

16. Nearly half of the world's population is affected in various ways by mountain ecology and the degradation of watershed areas. About 10 per cent of the Earth's population live in mountain areas with higher slopes while about 40 per cent occupy the adjacent medium- and lower-watershed areas. There are serious problems of ecological deterioration in these watershed areas. For example, the hillside areas of the Andean countries of South America a large portion of the farming population is now faced with a rapid deterioration of land resources. Similarly, the mountain and upland areas of the Himalayas, South-East Asia and East and Central Africa, which make vital contributions to agricultural production, are threatened by cultivation of marginal lands due to expanding population. In many areas this is accompanied by excessive livestock grazing, deforestation and loss of biomass cover.

17. Soil erosion can have a devastating impact on the vast numbers of rural people who depend on rainfed agriculture in the mountain and hillside areas. Poverty, including unemployment, poor health and bad sanitation are widespread. Promoting integrated watershed development programmes through effective participation of local people is a key to preventing further ecological imbalance. An integrated approach is needed for conserving, upgrading, and using the natural resource base of land, water, plant, animal and human resources. In addition, promoting alternative livelihood opportunities, particularly through development of employment schemes which increase the productive base, will have a significant role in improving the standard of living among the large rural population living in mountain ecosystems.

Objectives

18. By 2000, develop appropriate land use systems for both arable and non-arable land in mountain fed watershed areas to prevent soil erosion, increase biomass production and maintain the ecological balance.

19. Promote an alternative livelihood system through income generating activities and improvement in infrastructure and social services.

20. Develop technical and institutional arrangements for affected countries to mitigate the effects of natural disasters through hazard prevention measures, risk zoning, early warning systems, evacuation plans and emergency supplies.

Activities

Management related:

21. National governments should:

- a. Establish task forces or watershed development committees, complementing existing institutions, to bring together integrated services to support local initiatives in animal husbandry, forestry, horticulture, and rural development at all administrative levels.
- b. Enhance decentralized decision-making in the management of local resources through appropriate legislation.
- c. Support NGOs assisting local organization and communities in the preparation of projects that would enhance participatory development of local people.
- d. Derived from ****(A/CONF.151/PC/WG.I/CRP.12/Rev.1, para. 14d)** Provide mechanisms to preserve threatened areas that could protect wildlife, conserve biological diversity, or serve as national parks. **> ****
- e. Develop national policies that would provide incentives to farmers and local people to undertake conservation measures as well as to use environmentally friendly technologies.
- f. Undertake income generating activities in cottage and agro-processing industries, such as the cultivation and processing of medicinal and aromatic plants.

Data and Information:

22. National governments should:

- a. Establish monitoring and evaluation capacities at the national, state or provincial level to generate information for daily operations as well as to assess the environmental and socio-economic impacts of projects.
- b. Generate data on alternative livelihoods and diversified production systems at the village level on annual and tree crops, livestock, poultry, beekeeping, fisheries, village industries, markets, transport and income earning opportunities taking fully into account the role of women and integrating them into the planning and implementation process.

International and Regional Cooperation:

23. National governments, international agencies and regional organizations should:

- a. Strengthen the role of appropriate international research and training institutes of the consultative group on International Agricultural Research Centers (CGIAR) and the International Board for Soil Research and Management (IBSRAM) as well as regional research centers such as the Woodlands Mountain Institute and ICIMOD to undertake applied research relevant to watershed development.
- b. Promote regional cooperation and exchange of data and information among countries sharing the same mountain ranges and river basins, particularly among those affected by mountain disasters and floods.
- c. Establish partnerships with NGOs working in watershed development.

Means of implementation

Financial and Cost Evaluation:

24. Total funding required to implement this programme area is about US\$ 13,000 million a year, mostly from national local and private sources. Of the US\$ 13,000 million about US\$ 1,900 million would be needed from international sources. About US\$ 1,700 million would be related to development and about US\$ 170 million could be ascribed to global environmental issues. About US\$ 30 million is needed for strengthening the capacity of international institutions in particular those involved in watershed development such as UNDP, FAO, the World Bank.

25. Financing for the promotion of alternative livelihoods in mountain ecosystems should be viewed as part of a country's anti-poverty or alternative livelihoods programme which is also discussed in the chapters on Combating Poverty and Meeting Basic Needs and Promoting Sustainable Agriculture and Rural Development.

Scientific and Technical Means:

26. National governments and local communities with the cooperation of appropriate United Nations agencies as well as international and national research centres should:

- a. ** (A/CONF.151/PC/WG.I/CRP.12/Rev.1, para. 14g) < Consider undertaking pilot projects that combine environmental protection and development functions with particular emphasis on some of the traditional environmental management practices/systems that have good environmental impact. > **
- b. Generate technologies for specific watershed and farm conditions through a participatory approach involving local men and women, researchers and extension agents who will carry out experiments and trials on farm conditions.

- c. Promote technologies of vegetative conservation measures for erosion prevention, in situ moisture management, improved cropping technology, fodder production and agroforestry which are low cost, simple and easily adopted by local people.

Human Resource Development:

27. National governments and local communities should:

- a. Promote a multi-disciplinary and cross-sectoral approach in training and dissemination of knowledge to local people on wide-ranging issues such as household production systems, conservation and utilization of arable and non-arable land, treatment of drainage lines and recharging of groundwater, livestock management, fisheries, agroforestry, and horticulture.
- b. ****(A/CONF.151/PC/WG.I/CRP.12/Rev.1, para. 14f)** Develop human resources by providing access to education, health, energy, and infrastructure. ******
- c. Promote local awareness and preparedness for disaster prevention and mitigation combined with the latest available technology for early warning and forecasting.

Capacity Building:

28. National governments with the support of the international community should develop and strengthen national centres for watershed management to encourage a comprehensive approach to the environmental, socio-economic, technological, legislative, financial and administrative aspects and provide support to policy makers, administrators, field staff, and farmers for watershed development.

29. The private sector and local communities in cooperation with national governments should promote local infrastructure development, including organization of local and communication networks, mini- or micro-hydel development to support cottage industries, and access to markets.
